EMERGENCY ISSUE Price 6d.

THE ENGINEER

JULY 31, 1959 28 ESSEX ST., STRAND, LONDON, W.C.2 VOL. 208 No. 5401

PUBLIC APPOINTMENTS

UNIVERSITY OF TASMANIA

AUSTRALIA

LECTURESHIP OR SENIOR LECTURESHIP IN FLUID DYNAMICS

The University invites applications for the above position.

The salary grades for Lecturers are Grade II—£A1450—60—£1630 and Grade I £A1630—60—£2050, and for Senior Lecturer £A2150—60—£2510. Appointment will be offered within one of these grades according to qualifications and experience.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36, Grodon Square, London, W.C.1.

Applications close in Australia and London on 14th September, 1959. E6943

UNIVERSITY OF CANTERBURY

CHRISTCHURCH, NEW ZEALAND

LECTURESHIP IN CIVIL ENGINEERING

Applications are invited for the above position. Applicants should have a degree in Civil Engineering of a recognised University, teaching experience at a University, or have held a responsible position in a branch of Civil Engineering.

The salary will be at the rate of £1025 per annum, rising by annual increments of £50 to £1275 per annum. Commencing salary will be in accordance with qualifications and experience. An allowance is made towards travelling expenses.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36 Gordon Square, London, W.C.1.

Applications close in New Zealand and London on 30th September, 1959. E6944

ESSEX EDUCATION COMMITTEE

THURROCK TECHNICAL COLLEGE,

Woodview, Grays, Essex . .

ASSISTANT GRADE 'A'

Required for 1st September, or as soon after as possible:

Assistant Grade 'A' to teach Engineering Workshop subjects, especially Automobile Engineering. Applicants should possess C. & G. of London Institutional Certificate in Motor Vehicle Mechanics and have had some industrial and teaching experience.

Salary within range £498 15s. 0d. × £26 5s. 0d. to £971 5s. 0d. depending on training, qualifications, and experience.

Further particulars and application forms from the Clerk to the Governors at the College (stamped addressed foolscap envelope). E6937

LONDON COUNTY COUNCIL

MECHANICAL ENGINEER

Mechanical Engineer, A.M.I. Mech. E. or equivalent, experienced in heavy mechanical equipment, plant management and maintenance, to be head of section responsible for preparation of drawings and specifications for various mechanical plant, including automatic pumping stations. Knowledge of heating and ventilation an advantage. Maximum salary of £1,535 permanent pensionable position. Application form from Chief Engineer (59/47), L.C.C. County Hall, S.E.1. (1569). E6920

THE QUEEN'S UNIVERSITY OF BELFAST

TEMPORARY ASSISTANT LECTURER

Applications are invited for the post of Temporary Assistant Lecturer in the Department of Civil Engineering on the salary scale £700 × £50 to £850 per annum according to qualifications and experience. the appointment being renewable up to 3 years. Interest in research is essential. Applications should be sent to the Professor of Civil Engineering, Queen's University, before 20th August. E6931

ESSEX RIVER BOARD

ENGINEERING ASSISTANTS APT. IV (£1065—£1220)

Applications are invited for two permanent posts on the above scale at the Board's Head Office at Chelmsford.

Applicants should be Chartered Civil Engineers experienced in the design and calculation of river improvement schemes or surface-water sewerage schemes. Experience in the design of pumping stations or coast protection works would be an advantage.

Applications giving details of age, education and previous experience and the names of three referees with a knowledge of the applicant's technical experience should be submitted to Department 'E' at the address given below, not later than Monday, 10th August, 1959.

(Signed) W. J. S. BEW,
Clerk of the Board

Rivers House,
129 Springfield Road,
Chelmsford, Essex. E6946

PUBLIC APPOINTMENTS

READING TECHNICAL COLLEGE

DEPARTMENT OF ENGINEERING

SENIOR LECTURER

Applications are invited for the post of Senior Lecturer in Management Studies. Degree or equivalent, professional qualifications, teaching, industrial and administrative experience essential. Salary £1,350 × £50—£1,550 plus 5%.

Application forms and further particulars obtainable from the Principal, Reading Technical College, King's Road, Reading. E6928

THE QUEEN'S UNIVERSITY OF BELFAST

RESEARCH ASSISTANT

Applications are invited for the post of Research Assistant in the Department of Civil Engineering at a salary of £400 per annum. Applicants should give full qualifications, and state any special interests in engineering. Research Assistants are permitted to work for a higher degree. Applications should be submitted to the Professor of Civil Engineering, Queens University, before 20th August. E6932

GOVERNMENT OF NORTH BORNEO

NORTH BORNEO RAILWAYS

ASSISTANT MECHANICAL ENGINEER

To assist the Mechanical Engineer in the running, running maintenance and workshop maintenance and repairs of engines, rolling stock and plant of the North Borneo Railways. To assist in the training of subordinate staff.

Contract appointment for three years with salary according to experience in the range £1,302 to £2,324 p.a. with gratuity payable on satisfactory completion of contract. Free passages. Quarters at low rent. Generous home leave.

Candidates must be A.M.I.Mech.E. having completed a full mechanical engineering pupilage or apprenticeship with a railway administration followed by not less than ten years of railway mechanical engineering work including drawing office, running shed and workshops practical experience and be between 40 and 45 years of age.

Write Director of Recruitment, Colonial Office, London, S.W.1. giving full names, age, qualifications and experience, quoting BCD 110/21/04. E6936.

GOVERNMENT OF TANGANYIKA

EDUCATION OFFICERS

(Technical Training) preferably between 25 and 40, required to teach (a) Civil Engineering and allied subjects, (b) Building Construction and Drawing and elementary Quantity Surveying and allied subjects. Qualifications for (a) Degree in Engineering or A.M.I.C.E., (b) Corporate Membership of (1) Royal Institute of British Architects or (2) Incorporated Association of Architects and Surveyors or (3) Associate of Institute of Builders. Either a teachers certificate or minimum of two years' teaching experience essential for both posts. Posts on contract/resettlement grant terms. Home pension rights can be preserved. Salary at appropriate points in scale £879—£1,617 or £939—£1,863 inclusive. Quarters at low rental. Free passages and medical attendance. Outfit and Education allowances. Tour of service 30-36 months. Low Income Tax. Generous home leave. Further particulars and application forms from the Director of Recruitment, Colonial Office, London, S.W.1. quoting BCD 114/8/05 (b). E.6899

TENDERS

CITY OF LEEDS

WATERWORKS DEPARTMENT

Tenders are invited for the Construction, completion and maintenance of a rapid gravity filteration works and pumping station of 15 million gallons per day capacity, together with a 5 million gallons clear water reservoir and other ancillary works at Eccup Reservoir in the City of Leeds.

Contract documents and General Arrangement and Typical Detail Drawings may be collected from the undersigned upon payment of a deposit of Ten Guineas which will be refunded following the receipt of a bona fide Tender and the return of all Contract documents.

Arrangements may be made for detail drawings to be inspected on application to the Waterworks Department, Room 14, Civic Hall, Leeds, 1.

Tenders, duly completed, must be enclosed in plain sealed covers addressed to the Town Clerk and endorsed "Tender for Eccup Filteration Works", and be delivered at the Town Clerk's Office, Room 57, Civic Hall, Leeds 1, not later than 12 noon on MONDAY, the 14th SEPTEMBER, 1959. The corporation does not bind itself to accept the lowest or any Tender.

KENNETH L. FORSTER, M.I.C.E.
General Manager & Engineer
Waterworks Department,
Civic Hall,
Leeds, 1. E6902

EDUCATIONAL

A.M.I.MECH.E., B.Sc., City and Guilds, &c. Guarantee Postal Courses for all Exams. and Technical Divisions from Elementary to Degree standard including Automation Techniques. Approximately 95 per cent successes. 148-page prospectus free on request.—B.I.E.T. (Dept. 22), 29, Wright's Lane, London, W.8. E114 z

ELECTRONICS, covering practical and theoretical aspects, basic principles, Industrial applications, electronic apparatus, &c. Guaranteed coaching for Brit.I.R.E., City and Guilds, &c. Study at home under highly qualified tutors.—Write for free book: International Correspondence Schools, 71, Kingsway (Dept. 446A), London, W.C.2. E157 z

SITUATIONS VACANT

APPLICANTS ARE ADVISED TO SEND COPIES NOT ORIGINALS, OF THEIR TESTIMONIALS UNLESS OTHERWISE REQUESTED.

A DESIGN/DRAUGHTSMAN required by expanding Engineering Company for new Factory being erected in East Anglia. A good knowledge of plant ayout, mechanical handling, automatic feed mechanisms coupled with general factory services is required. Previous experience is essential. H.N.C. level preferred. Production engineering or Works Study experience an advantage. Initially posted in Essex, later East Anglia. Attractive working conditions. Part-contributory pension and life assurance scheme. Salary commensurate with age, experience and qualifications. Write giving full details of career to Box No. E6940, "The Engineer".

ASSISTANT WORKS NGINEER required for Chemical Manufacturer in East London Area. Technical Training to H N.C. standard. Chemical Works Experience is essential. Age preferred between 28—33 years. Salary according to experience. Pension scheme. Box No. E6941, "The Engineer"

ASSISTANT MECHANICAL ENGINEER

to understudy Chief Engineer of an expanding group for 2/4 years before managing a department. Age 30/35, Qualifications: A.M.I. Mech.E., or B.Sc. Experienced in technical and commercial aspects of general engineering including Cranes, construction and earthmoving equipment, mechanical handling or similar. This is an excellent opportunity for man with initiative and ambition Salary £1,000/£1,500 according to ability and experience Box No. E6911 "The Engineer".

B.A.T.

BRITISH-AMERICAN TOBACCO COMPANY LIMITED

require a

FACTORY ENGINEER

for service with an associated company in West Africa. Applicants up to 35 years of age should possess G.I. Mech. E. or equivalent qualifications. Salary according to age and experience, free passages and furnished accommodation provided. Posts are pensionable and offer good permanent prospects to qualified engineers with practical Engineering experience.

Apply in writing, giving full details of age and career to Personnel Dept. (No. 11), British-American Tobacco Co. Ltd., Westminster House, 7, Millbank, S.W.1. E6926

CHIEF INSPECTOR

A Chief Inspector is required immediately in the Chemical and Metallurgical Division, Towcester, Northamptonshire.

Applicants should have an engineering background, technical qualifications to H.N.C. or Grad.I.Mech. E./I.E.E. standard and several years practical inspection experience. A knowledge of radio and electronic components, particularly in capacitors, ferrites, ceramics or semiconductors is preferred.

This is an opportunity to join a vigorously expanding go-ahead Division.

There is a contributory superannuation scheme: a salary up to £1,500 per annum will be paid.

Apply to:—The Regional Personnel Manager,
THE PLESSEY COMPANY LIMITED,
WOOD BURCOTE WAY,
TOWCESTER,
NORTHAMPTONSHIRE. E6952

EDWARD A. PITCHER & PARTNERS, Consulting Engineers, will shortly be opening a new office in the S.W.1 area, and invite applications from experienced Structural Engineers, minimum age 28, preferably with R.C. and Steel Design experience. R.C. Designers and R.C. Detailers. Excellent opportunities with expanding firm. Salaries in accordance with experience and qualifications, 21a, Aylmer Parade, N.2. MOU 1852. E2487

ESTIMATOR required for London Office of Major Petroleum Distribution Company engaged on the construction of storage installations involving civil engineering, building work, and pipelines. Applicants should have had experience of work on projects of this type. Starting salary commensurate with qualifications and experience. Excellent pension scheme. Apply giving full details of age, qualifications and experience to Box No. E6922, "The Engineer".

SITUATIONS VACANT

ENERGETIC TECHNICIAN WITH SELLING ABILITY required to develop a new READY MIXED CONCRETE business being started on the South Coast by a well established Company. Car provided and company flat available. Salary according to experience. Write stating full particulars of age, qualifications and experience to Box No. E2486. "The Engineer".

JAGUAR CARS LIMITED

require

WORK STUDY ENGINEERS AND ESTIMATORS

With experience in the following departments:—

Body Assembly Track
Trim Shop
Paint Shop
Saw Mill

Write giving full details:—

Personnel Officer,
JAGUAR CARS LIMITED
Browns Lane,
Coventry. E6939

MECHANICAL ENGINEER required in October by open cast Iron Ore Mining Company in WEST AFRICA. Age approximately 30/35 with experience of preventive maintenance, work study and general workshop practice, preferably of open cast mining and conveying equipment. Commencing salary £1,500 per annum plus 5% bonus plus for married man, passage or separation allowance of £10 per month and £5 per month for each child. 15 month tours followed by liberal leave on full salary in U.K. Return passage paid. Free furnished quarters and medical attention. Contributory Pension Scheme with retirement at age 55. Life Assurance and Dependent Income Schemes. Write, giving full details experience, stating age, married or single, to SIERRA LEONE DEVELOPMENT CO. LIMITED, Dept. ME6, City Gate House, Finsbury Square, E.C.2. E6933

MSL have been retained to advise on the appointment of a

GENERAL MANAGER (Passenger and goods lifts, for British engineering company with assets exceeding £20 million.

The company has recently secured exclusive U.K. selling and manufacturing rights for high quality lifts from a well-known overseas manufacturer, and is about to enter the British market.

A man is required to lead the marketing effort and, if successful, to become Managing Director of a new company within two years. He will then be responsible for all aspects of the business, including sales, co-ordination of manufacture by associate companies, erection and maintenance.

Candidates should preferably have experience of negotiating the sale of lifts. Enquiries will also be considered from engineers with sales management experience which includes the sale of capital goods through architects. Preferred age 35 to 48.

Starting salary about £2,500/£3,000: pension: location London.

Please send brief details in confidence, quoting reference G1801, to R. A. Denerley. In no circumstances will a candidate's identity be disclosed to our client unless he gives permission after a confidential interview at which he will be given full details of the appointment.

MANAGEMENT SELECTION LIMITED
17, Stratton Street, London, W.1
E6951

PROFESSIONAL ENGINEERS

are required by the Atomic Energy Research Establishment, Harwell, for design work on projects associated with existing reactors. Nuclear engineering knowledge is not essential: opportunities for training in nuclear engineering practice will be available.

Applicants should preferably have had experience, either in mechanical engineering or associated with chemical plant, which covers various aspects of heat transfer, fluid flow or pressure vessel design.

Salary £845–£1800 depending on age & experience .

Housing and superannuation schemes.

Please send a POST CARD to the Group Recruitment Officer (5014/25) A.E.R.E., Harwell, nr. Didcot, Berks., for details. E6942

PUMPS—Technical Sales Representative. A vacancy occurs in the Manchester Office of Drysdale & Co., Ltd., engaged in the manufacture of all kinds of pumping plant. Applications are invited from men between 25 and 35 years of age with good personality and a capacity for original creative thinking. Applicants should be apprentice trained and hold H.N.C. or equivalent. The position offers excellent prospects with a progressive salary scale and there is a superannuation scheme in operation. Please reply direct to the Secretary, Drysdale & Co., Ltd., Yoker, Glasgow, W.4. giving details of age, past experience and training, etc. E6896

SITUATIONS VACANT

PLESSEY NUCLEONICS LIMITED

Senior Mechanical Draughtsmen are invited to apply for vacancies in the Research and Development Department at Northampton. A steady flow of interesting and varied projects is overloading our present staff so we are able to offer attractive positions to suitably qualified men with above average initiative.

Applicants should possess at least O.N.C. or equivalent, and have had at least five years' experience in one or more of the following fields: Light mechanisms, pneumatic controls, hydraulic systems, pressure vessels (to B.S.1500), jigs and tools, and scientific instruments. It is expected that many well qualified designers will not have had experience in several of the specialised techniques used by the Company. Arrangements have therefore been made to give suitable training in appropriate cases.

Please apply in writing to the Personnel Officer, Plessey Nucleonics Ltd., Weedon Road, Northampton, giving full details of qualifications and experience. Further details of the projects to be undertaken will be discussed with those candidates selected for interview and every effort will be made to suit the particular interests of each individual. Starting salaries will be in the range of £800—£1100 p.a. according to qualifications and experience. E6953

QUALIFIED MECHANICAL ENGINEER, age 25/30 required by medium sized General Engineering Works, Bolton area. Duties design and research in existing and new productions. Experience in large hydraulic presses, rubber machinery and/or glass machinery an advantage. Salary according to experience and qualifications. Pension scheme and commission. Progressive appointment for right man. Box No. E2482, "The Engineer".

SENIOR DRAUGHTSMAN required to undertake design work in all fields of application of aluminium including building, road transport, railways, shipbuilding and general engineering. Sound knowledge of structural design required but experience of aluminium not essential. Location Banbury, Oxon. Write giving full details to Personnel Officer, Northern Aluminium Co. Ltd., Bush House, Aldwych, London, W.C.2. E6934

SHELL-MEX AND B P LTD have a vacancy in their Southern Division for a qualified Engineer. The position is based at Southampton and the Division covers most of the South Eastern Counties. Candidates should have had thorough training in workshops and possess either Corporate Membership of the Institutions of Civil or Mechanical Engineers or have passed parts A & B of one of these Institution's examinations (or have qualifications entitling them to exemption from such examinations). Experience on pumps and pipelines or building construction will be advantageous. Excellent Pension Scheme. Starting salary commensurate with qualifications and experience. Apply in writing giving full details of age, qualifications and experience to the Staff Manager, (Ref.D/173), Shell-Mex House, Strand, London, W.C.2. E6862

STRUCTURAL STEELWORK DESIGNER with a good knowledge of light structures as well as conventional steel design required by Consulting Engineers. Five day week. Pension Scheme. Holiday arrangements honoured. Apply stating details of experience and salary required to Alan Marshall & Partners 73/74 High Holborn, W.C.1. E2476

THE BEECHAM GROUP has a vacancy for a Senior Chemical Engineer (30-40) with experience in Central Plant Design and operation and a sound engineering background. Experience in refining or fermentation an advantage but not essential. This is a senior appointment and carries a commensurate salary together with non-contributory pension fund and profit participation scheme. Application in writing giving full details of age, qualifications and experience and quoting reference SCE 35, should be forwarded to th; Personnel Controller, Beecham Group Limited, Beecham House, Great West Road, Brentford, Middlesex. E6912

TELECONTROL ENGINEER

A major Oil Company requires an engineer well versed in up to date V.H.F. Telecoms practice capable of undertaking the design and of supervising the installation and commissioning of telecontrol and telemetering systems in connection with their fields installations and distribution systems, the latter including large pumping stations to be remotely controlled.

Salary will be commensurate with the importance of the post which is pensionable and the successful candidate will be required to pay occasional visits to the East.

Write stating age, technical qualifications and experience to Box TE.925 c/o 191 Gresham House, E.C.2. E6945

THE BETHLEM ROYAL HOSPITAL. ASSISTANT ENGINEER required. Salary £545 rising to £670 p.a., plus London Weighting. Five-roomed flat available at reasonable rent. Apprenticeship in electrical engineering and a sound knowledge of Institutional boiler plant essential. Application form obtainable from House Governor and Secretary, Bethlem Royal Hospital, Monks Orchard, Beckenham, Kent. (T/E). E6950

THE GENERAL ELECTRIC COMPANY LIMITED

ATOMIC ENERGY DIVISION

MECHANICA ENGINEER

A vacancy exists in the Contracts Department for a Mechanical Engineer to join a team responsible for the preparation of Commissioning Schedules and Operating Instructions for Nuclear Power Stations.

Applicants should hold H.N.C. or equivalent qualifications and have a good general mechanical engineering background with some Power Station experience.

Write for application form in the first instance to The Personnel Manager (CON/SO), The General Electric Company Limited, Erith, Kent. E6935

YOUNG ENGINEER to manage and expand medium sized light engineering works in West London. Write Box No. E2491, "The Engineer".

SITUATIONS VACANT

BRITISH TITAN PRODUCTS COMPANY LIMITED

have vacancies for

MECHANICAL ENGINEERS

at their Grimsby and Billingham Factories.

The Company is primarily concerned with the manufacture of Titanium Dioxide and is characterised by a tenfold expansion in post-war years. This continuing expansion offers plenty of scope for Engineers in the fields of Plant, Maintenance, Construction and Design. The current vacancies are for Maintenance and Construction work with opportunities later in the Design field.

Preference will be given to candidates with a University degree in Mechanical Engineering, but those with an equivalent professional qualification will also be considered. Post-graduate Apprenticeship is essential and the upper age limit for the appointments is 30.

Salaries and prospects are very attractive for men with the right qualifications. Annual Bonus Scheme and Non-Contributory Endowment Assurance and assistance for married men with house purchase and removal expenses.

Applications in strictest confidence to be addressed to the

PERSONNEL MANAGER,
BRITISH TITAN PRODUCTS COMPANY LIMITED,
BILLINGHAM, Co. DURHAM, quoting reference S.4. E160

THE GLACIER METAL COMPANY LTD.

Invites Applications for the post of

CHIEF PRODUCTION ENGINEER SERVICE GROUP

The person appointed will work as a member of the Company's Technical Division attached to the General Manager Service Group. This Group, with Headquarters in London, consists of three engineering units situated in London, Glasgow and Manchester, engaged on the specialised manufacture, white metalling, and repair of bearings of widely varying sizes, predominantly heavy and medium, all involving short runs.

The Chief Production Engineer is responsible for the framework of technical methods used in the Group. He has to work out and recommend to his General Manager policy concerning standards of performance, techniques of manufacture, developments required and plant and equipment to be bought. He must ensure that the General Manager's policy is implemented throughout the Group.

Candidates should have an engineering degree or equivalent and some knowledge of metallurgy would be an asset. Experience of machine tools and of jobbing work would be an advantage and a strong capacity for imaginative perceptive planning is required.

Though based on London, some travelling will be necessary.

There are excellent career prospects. SALARY RANGE £1,650—£2,150 per annum. Candidates in their 30's are likely to be most suitable but others will be considered.

Applications should be sent to

Personnel Director Ref. TMSG,
The Glacier Metal Co. Ltd.,
Ealing Road, Alperton, Wembley, Middlesex. E6930

WORKS MANAGER to take charge of Medium sized specialist fabrication works. Experience in specialised construction of medium and heavy fabrication essential. Application in writing stating qualifications and experience to Box No. E2485 "The Engineer".

VACANCY FOR MAN FOR GENERAL TRACTOR REPAIRS, etc. and to run Cold Storage Plant. Modern house on Farm. Apply—THE GROVE FARMS (HARWELL) LTD., Woodlands, Milton Hill, nr. Abingdon, Berks. E6942

WELL-KNOWN STEEL AND ENGINEERING ORGANISATION requires highly efficient executive with experience of and connections with the Engineering Industry. Position Progressive. Prospects of early advancement and Directorship. Applications will be treated in confidence. Write with full details of experience and names of three referees. Box No. E2487. "The Engineer"

WORK STUDY

A major industrial organisation requires a trained Work Study Engineer with 3 to 5 years' experience in medium industry.

The successful candidate must be able to work without detailed supervision and should also have some knowledge of mechanical handling.

This is an interesting position and prospects are quite bright. Please write stating full details of age, experience and qualifications to Box E6938, "The Engineer".

YOUNG QUALIFIED ENGINEER required to fill vacancy of Field Service Engineer/Demonstrator previous knowledge Spring Making and/or Wire Trade an advantage. Successful candidate will be given three months training in Switzerland engagement subject to contract. Write giving details of age, qualifications, experience, salary required to Box No. E2481, "The Engineer".

EXPERIENCED ENGINEER, preferably machine tools, age up to 50, for Calcutta branch Office of reputable West End company engineers and agents, Public School or good technical background, excellent prospects. Pension scheme. Only smart men with ability, drive and appreciation Indian culture need apply. Full particulars apply—Box No. 2472. "The Engineer".

SITUATIONS WANTED

EXPORT EXECUTIVE (44), Engineering Degree, A.M.I.E.E., Specialist Power Generation, Transmission and Distribution; Steam and C.O., Allied Machinery. Fluent Spanish and Portuguese. Many years resident Latin American Countries. Accustomed dealing at top level including Government Departments. Now free to join suitable Export Organisation. Write Box E2489 "The Engineer",

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REMPLOY SPONSORSHIP SCHEME.—Send for details which show an attractive proposition to manufacturers.—Write to the Managing Director, Remploy, Ltd., 25-28, Buckingham Gate, S.W.1, or telephone VICtoria 6621 (12 lines). E155 o

ADVERTISER, PRIVATE INVESTOR desires to purchase whole or part interest in concern under progressive management making annual net profit of £15/50,000. Box No. E.158, "The Engineer".

MISCELLANEOUS

WORKS DOCKETS, TIME SHEETS, COSTING SHEETS, STORES FORMS AND EVERY DESCRIPTION OF PRINTING for the Engineering and Allied Trades. Quotations by return. Prompt delivery.—J. H. Yeomans (Printers), Ltd., 4, Sunbeam Road, London, N.W.10 (Elgar 7928/7800). E5902 I

DAVIES INVESTMENTS LIMITED, Bankers, still offer 7½ per cent. on sums £20 to £500 (withdrawal on demand) with extra ¼ per cent. on each £500 unit.—Details from Investment Dept., E.R. Davies Investments, Ltd., Danes Inn House, 265, Strand, London, W.C.2. E149 I

SUB-CONTRACTING

KELLERING AND CAM PROFILING capacity up to 8ft. by 6ft. or 6ft. diameter.—ARMYTAGE BROS. (KNOTTINGLEY), Ltd., The Foundry, Knottingley, Yorkshire (Telephone : Knottingley 2743/4). E116 MW

CASTINGS.—We can save your porous castings, ferrous or non-ferrous, by an approved impregnation process ; sample castings treated ; A.I.D. approved. —Recupero, Ltd., 66, South Harrow Viaduct, Harrow, Middlesex ('Phone, Byron 1178). E109 MW

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Technical staff will call on invitation.

Enquiries to Mr. J. S. Hanna, Bridgeton Foundry Glasgow, S.E. (Tel.: BRIDGETON 4381-5). E6924 MW

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REQUIRED—Mild Steel Rod, Reinforcing Fabric, Corrugated Iron, Steel and Alloy Scaffolding and Fittings, Scaffold Boards, Trench Struts, Road Forms, Trestles, Ladders, Steps, Rammers, Floor Sanders. Prompt Inspection, Collection and Payment. E. H. Church & Co. (Edmonton) Ltd., 70, Penge Road, South Norwood, S.E.25. Tel. SYD 3131. E2490

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ELECTRICAL PLANT
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Upper Villiers Street · Wolverhampton.
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E6711 F

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BOILER: One No. 16C Cochran-Kirke Verticle Sinuflo Steam Boiler. Constructed in 1953 for 125 p.s.i. and with an evaporation of 4,800 lb/hr. F and A 212deg. F. when fired with town's gas with a calorific value of 450 B.T.U./Cu. Ft. Complete with mountings as follows:—Cast iron angle stop valve, check feed valve, double enclosed spring safety valve, blow-off valve (bronze), two gauge glasses. Trist feed regulator pressure gauge, Drayton low level cut out (electric), gas control, valve and solenoid-operated pilot valve, and gas governor. Further particulars may be obtained from the Secretary, British Rayon Research Association, Heald Green Laboratories, Wythenshaw, Manchester 22. E6919

ROLLING MILL DRIVE

150 h.p. Rolling Mill Drive, including English Electric Slip Ring Induction Mill Motor 3,300 volts, 3 phase, 50 cycles. 488/450 r.p.m. Direct coupled through Bibby coupling to Power Plant Gearbox 475/200 r.p.m. with heavy balanced flywheel and 11in. centre 2 high pinion box. All new 1936 and in first class condition. Available for immediate delivery. Apply Box No. E6927, "The Engineer".

FOR SALE

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STEAM BOILERS.—Cochrane Vertical (New), 8ft. 6in., 8ft., 7ft. 6in., 7 ft. and 6ft. in dia. 100/150 lb. w.p.; reconditioned 8ft. 6in. down to 3ft. dia.; Economic 4ft. to 11ft. 6in. dia., including new 7ft. and 8ft. dia., 150, 180 and 200 lb. w.p.; 300 reconditioned Vertical Crosstube, all sizes.

AIR COMPRESSORS.—Two Belliss & Morcom 2500 c.f.m., 100 p.s.i., 550 h.p. motors; also Broomwade 500, 400, 300, 200 and 130 c.f.m., all motorised; and several others of various makes and capacities.

200 AIR RECEIVERS, stocked up to 9ft. dia., 100 to 500 lb. pressure.

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OVERHEAD CRANES.—40-ton Babcock, 40ft. span, 400/3/50, "Goliath"; 30/5-ton Adamson, 42ft. 3in. span, 400/3/50; 20/6-ton Vaughan, 42ft. 3in. span, cab type (6); 20-ton King, 42ft. 3in. span, 400/3/50; 15-ton Morris, 35ft. span, hand operated; 10-ton Morris, 45ft. span, 36ft. lift; 10-ton Morris "Goliath", 40ft. span. 400/3/50; 10-ton Vaughan, 23ft. 6in. span, 400/3/50; 10-ton Vaughan, 21ft span, 44ft. lift 7½ tons Wharton, 25ft. span, 400/3/50; 5-ton Henderson, 24ft. 7in. span, 1946; 5-ton Morris, 55ft. span, hand operated; 5-ton Royce, 2-motor crab, 440/3/50; 5-ton King, 29ft. 3 in. span, power hoist, hand travel; 5-ton Morris, 28ft. 6in. span, power hoist, hand travel; 4-ton Morris, 19ft. span, 220V, d.c. (3); 3-ton Adamson, 48ft. span, 400/3/50; 2-ton Adamson, 34ft. span, 400/3/50 (2); 2-ton Morris, 18ft. span; 2-ton Vaughan, 27ft. 6in. span, 2-motor; majority of the above are unused.

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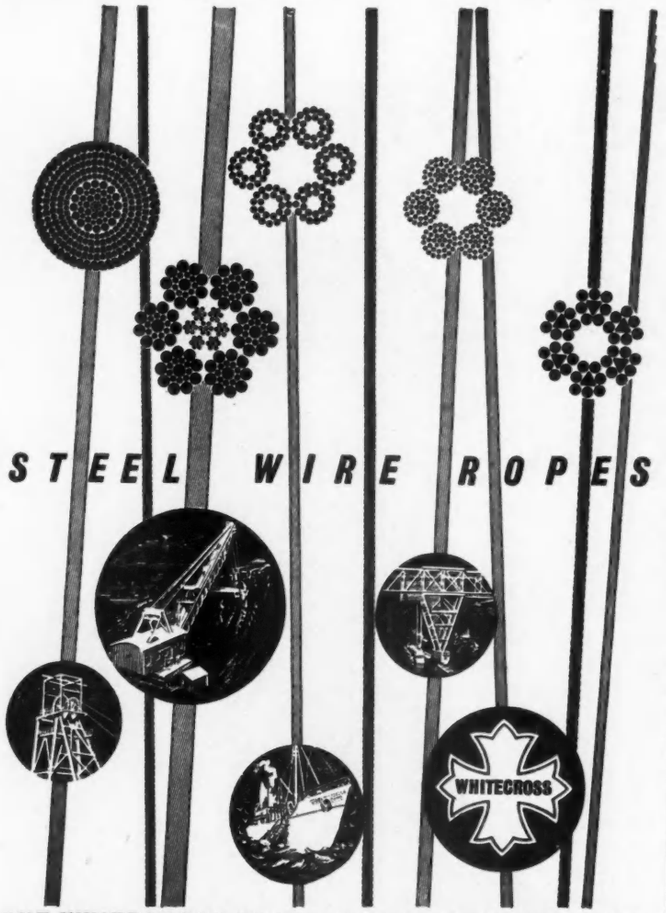

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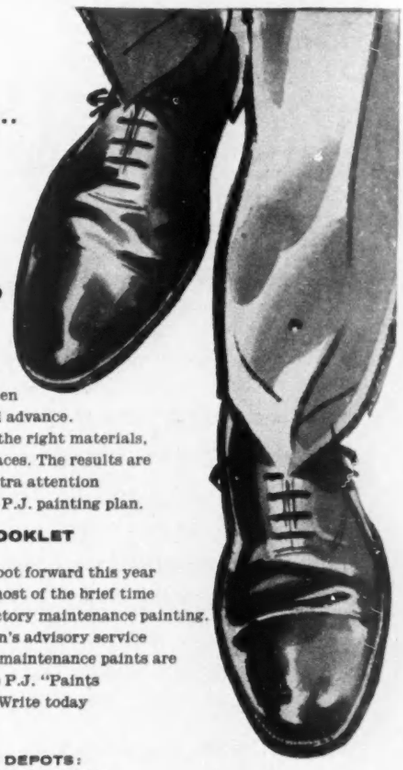

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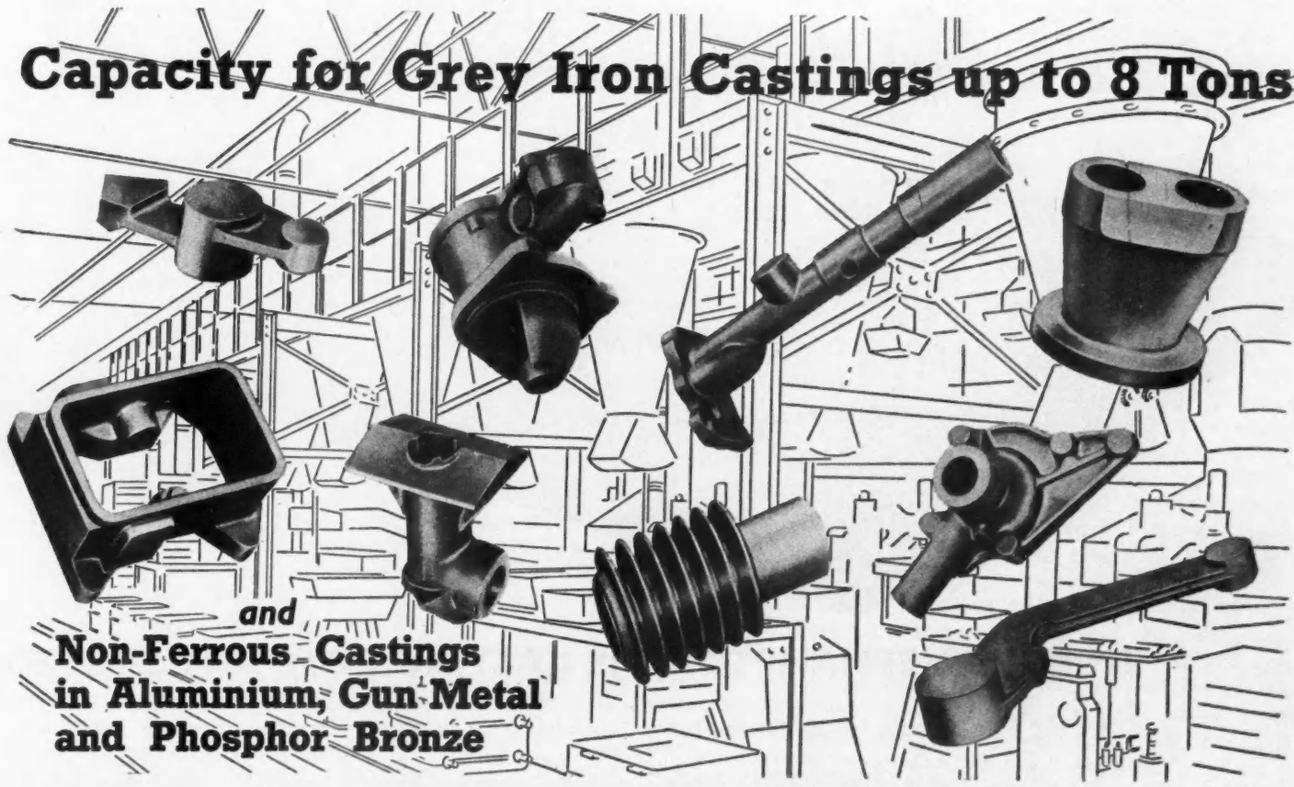

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THE ENGINEER

No. 5401 JULY 31, 1959 VOL. 208

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RAILWAY RE-APPRAISAL

When the Transport (Borrowing Powers) Bill was being debated in Parliament last December, the Minister of Transport announced that the British Transport Commission had initiated "a full, detailed and urgent review" of the whole of the railway modernisation plan. This detailed re-appraisal was published in the form of a White Paper at the end of last week. It is a document which will be carefully studied, we believe, by all who are enthusiastic and optimistic about the future of British Railways and by those critics who incline to the view that rail transport, even when modernised can never again be what it has been! We need not add that Sir Brian Robertson, the Commission's chairman and the principal author of the White Paper, remains firm in the ranks of the optimists. He is convinced that a modern railway system is essential to the prosperity of the country, a conviction, he claims, which is shared by "the government, the bodies representing trade and industry and by public opinion".

The main conclusion reached by the British Transport Commission after making this re-appraisal is that modernisation should be pressed forward at a rate faster, if practicable, than envisaged in the plan published in 1955. The White Paper details the progress made up to the end of last year. It will be recalled that the modernisation projects, as devised in 1955, were costed at £1,500 million, with additional items assessed at a further £160 million; in the first four years to the end of 1958, capital investment in British Railways amounted to £421 million. Now, the Commission is anxious that modernisation which, it avers, is already ahead of schedule should be speeded up with the object of improving the financial position of the railways as quickly as posible. The Commission's aim, and it is a praiseworthy one, is that in the next five years "a more compact railway system and a more economic scale of operations shall be achieved". It involves accelerating the investment in the railways and accelerating the "streamlining" of the railway system to secure more work from a smaller but more efficient equipment. Among the Commission's intentions for this "streamlining" operation are a reduction in route mileage, between now and 1963, of the order of 10 per cent and reductions in the total number of locomotives, passenger vehicles and freight wagons which "will reflect the much greater availability of diesel and electric power enabling fewer units to do more work". No closure of main lines is foreseen between now and 1963 although, the Commission thinks, a few would justify review later on. But there will be considerable alterations in the services on certain main lines and a number of stations and depots are to be closed.

To many engineers, the most important part of the White Paper is that which describes the actual modernisation plans for the next five years. Among them are the relaying of over 8,000 miles of track and the reconstruction or strengthening of 900 bridges, colour light signalling on 3,000 track miles apart from the 1,700 miles already installed, and electric traction brought into operation on 600 route miles in addition to the 1,000 miles of electrified track in service at the beginning of this year. The re-appraisal has obviously strengthened the conviction that suburban electrification schemes should be pressed forward as rapidly as possible. In commenting on the Commission's intentions, Sir Brian had no hesitation in stressing the beneficial results from the electrified services introduced in recent years. The main line electrification from Euston to Birmingham, Crewe, Manchester and Liverpool, work on which is progressing, is to be given priority over that from King's Cross. This in no way implies abandonment of the King's Cross main line electrification project; what it means is that by concentrating all its present resources on the West Coast route, the benefits from main line electrification will become more quickly apparent. This bolder approach to more extensive electrification in the years immediately ahead may well prove to be the most realistic step the British Transport Commission has taken in its determination to modernise successfully this country's railway system.

CONTROLLED THERMONUCLEAR PROBLEMS

In his opening address to the I.E.E. Thermonuclear Conference held in London last April, Dr. B. F. J. Schonland set the scene by asserting that, "the long path towards achievement of a controlled thermonuclear reactor will contain a number of steps". The first is to show "in laboratory conditions that a deuterium plasma can be maintained at such a temperature as to cause fusion as a result of the random motion of the colliding nuclei". In fact nobody has succeeded with certainty in this first step, mainly because it has proved to be very difficult to confine the plasma for long enough to heat it to the temperature needed for a true controlled thermonuclear reaction. Most of the energy that is put into the plasma to heat it is very rapidly lost and only a small fraction is retained as heat. The loss is much greater than had been predicted and very little is yet known about the causes of the loss or about the associated instabilities in the plasma that have proved to be so difficult to control. Briefly the first task, which is now engaging the attention of many British workers in this field, is that of studying the basic physics of the plasma, to understand its behaviour at high temperatures and high conductivity. Until this is done, it is, as Dr. Schonland emphasised, idle to talk of a thermonuclear reactor.

In consequence there has been a noticeable expansion of the work on smaller scale gas-discharge devices in which the physics of the plasma can be studied more conveniently than in large equipments like "Zeta". For example, as stated in the fifth annual report of the United Kingdom Atomic Energy Authority, several straight and toroidal systems are being built with the aim of studying different methods of confining plasma, the formation of skin currents and their effect on the stability of the discharge, and on the effect of pre-heating the discharge to make it more nearly fully-ionised at the start of the current pulse; the heating of plasma will also be studied.

It is not to be inferred that work on "Zeta" has been abandoned. Indeed, as Sir William Penny stated at a recent press conference there is at least a year's useful work for this apparatus in its modified form.

Looking beyond that the A.E.A. is now designing, as part of its "more radical attack on the problems of current and magnetic field distribution" a new experiment which will be known as "Intermediate Current Stability Experiment" or I.C.S.E. (pronounced "ICE", for convenience). It will be slightly larger than "Zeta" and will consist of a torus designed to contain a fast-pinch discharge. With the object of producing stable plasma I.C.S.E. will incorporate an elaborate system of magnetic fields of opposite direction inside and outside the plasma. I.C.S.E. typifies the British contribution towards a better understanding of the plasma and the influences that control it. When this knowledge has been won it may well turn out as Dr. Schonland has suggested that "the suppression of instabilities may prove to be a matter of a few simple tricks". But it is as well to realise that research workers in this field are still hardly beyond the beginning of the road, that they do not yet know its length or character and cannot see round the first bend.

Economy in Post Office Buildings

A joint Post Office-Ministry of Works Development Group set up in 1957 to investigate means of reducing the cost of buildings has completed its first two tasks. They were to plan a 10,000-line automatic telephone exchange building for Altrincham, and a medium-size head Post Office for Hitchin. As a result of the work of the group, the estimated cost of the Altrincham exchange building is stated to be £27,000, or less than half the cost of any building finished in recent years for the same size of telephone exchange. The estimate for Hitchin Post Office is about £63,000 compared with an original rough estimate of over £100,000. In planning the Altrincham exchange the exploitation of current Post Office Engineering Department work on the design of telephone exchange equipment has resulted in savings both of space and expensive special construction. Alterations in layout have enabled space required several years hence for extensions to be put to practical use at once for essential purposes. Three areas in the apparatus room required for growth of equipment in future are to be partitioned off at the outset to form contractor's and construction premises, a stock and workroom, and an assistant engineer's office. Another important saving will result from dispensing with the basement cable chamber hitherto necessary in all but small exchanges, usually about 9ft high and 9ft wide and extending practically the full length of the building. In the Altrincham building the cables will enter just above ground level and will be carried on bearers along the inner face of the external wall of the apparatus room. The cables will be encased above floor level and the casing fitted with removable access panels.

The Hitchin Post Office has been planned with the idea of providing the smallest building practicable to meet foreseeable needs and of allowing for uncertain developments and growth of work by designing the building so that extensions can be carried out easily and cheaply. The public offices, and the offices associated with it, will virtually be enclosures within the sorting office. It will be easy to extend the public office if necessary into the sorting office, so that a 25 per cent increase in counter requirements would mean a loss of only 4 per cent space for sorting.

Increased Capacity of Submarine Telephone Cables

An agreement has been drawn up between the British Post Office and the American Telephone and Telegraph Company regarding the use of terminal equipment developed by the two organisations to increase the capacity of submarine telephone cables without modification to the cables themselves. The British technique relates to the channelling equipment, and enables telephone circuits to be provided in a bandwidth of 3kc/s instead of 4kc/s as at present, permitting an increase of one-third in cable capacity. The American technique is known as Time Assignment Speech Interpolation ("The Engineer," March 27, 1959, page 515) and is based on the fact that on any group of circuits comprising separate "go" and "return" channels, at least half are idle at any instant while speech passes in the opposite direction. By switching speech to these idle channels additional conversations can be carried and cable capacity doubled. Both techniques will have their use according to the increased capacity required. The Post Office states that where necessary the two techniques could be used together to provide about two and a half times the number of circuits available in an unmodified system.

Carbon Disulphide Recovery

In operation at one of the production units at Courtauld's Greenfield Works, Holywell, North Wales is a plant designed to recover substantial quantities of carbon disulphide (CS_2) from the factory exhaust gases. It is expected to recover more than two-thirds of the total CS_2 used in the production unit and the main technical point of interest is the use of "fluidised" active-carbon beds. Research into the possibilities of recovering CS_2, which is the principal chemical used for making the soluble cellulose derivative from which rayon fibres can be extruded, has been in progress for some years. A pilot plant was eventually built, based upon which a full scale "Landmark" plant was eventually constructed. This unit 170 ft. in height contains a large vertical duct, an adsorber, a stripper/dryer and carbon circulating and regenerating systems. The CS_2 laden gas is blown up the duct into the adsorber where it fluidises several beds of active carbon which adsorb the CS_2. The carbon moves across each tray and stripper/dryer where the CS_2 is removed by steam. The carbon disulphide is condensed and passed to storage ready for use while the active carbon, a proportion of which is separated for treatment to remove impurities before being returned into circulation returns to the adsorber.

Coil Springs

"Possible Future Technical Requirements of the Spring Industry" was the subject of a paper by Mr. J. K. Bache at the annual conference of the Coil Spring Federation Research Organisation, which was held recently at Hythe. The Director of Research, Mr. R. Haynes, reviewed the research programme for the past year and outlined future activities. The spring industry may design in titanium or other such unusual metals and alloys in order to meet the future demands of gas turbines, jet engines and rockets, where low weight is essential and abnormal increases or decreases of temperature will be encountered.

In the discussion of these papers Dr. R. Genders said that new sources of beryllium had been found so that its alloys may prove to be useful for lightweight, strong springs. Springs may often become the heart of automation, and even if electronics are the brain, the failure of a very small spring might halt the production of a factory. It was clear that there was enough research work to occupy the organisation for many years to come. During the last year work had been carried out on the copper-beryllium alloys and they planned to extend this work to cover some pure Be.-Cu.-Co. alloys. Many resinous and plastic materials have been examined as possible coatings for spring steels, to prevent corrosion fatigue, and some novel forms of metallic coatings are now to be tested in a similar manner. For brass spring wire straight drawing and low temperature heat treatment have been demonstrated to be beneficial. Research on shot peening of springs aimed at getting the best out of the process. The type of shot, size, speed, and time all needed control and some users sought an improvement in the Almen gauge. An investigation is to be undertaken into the mechanical and metallurgical properties of cross rolled strip. In the final discussion Mr. D. A. Oliver mentioned that powder metallurgy was opening up fresh vistas and a new material, Molybdenum-Rhenium, was of interest to the electronics industry.

Electric Furnace Temperature Controller

A proportional temperature controller operated by a resistance thermometer and transductor has been introduced by C.N.S. Instruments, Ltd., 61 Holmes Road, London, N.W.5. Changes in thermometer resistance act in a bridge circuit to give a continuously variable current governing the output of a saturable reactor. For most furnace applications the reactors are of $\frac{1}{2}$, 1, $1\frac{1}{2}$ or 2kVA rating. Used with a 1kVA reactor, the power supply to a furnace can be set at from 200VA to 1kVA by adjustment of the bridge precision thermometer. After this setting, changes in furnace temperature will readjust the current to maintain constant temperature. Saturable reactors are available to enable almost any furnace or oven to be run directly from the mains supply, whether 110V or 240V. Automatic compensation for mains voltage variation is incorporated in the controller.

Time Calibrator Unit

A new version has been announced of the time calibrator unit made by Cawkell Research & Electronics, Ltd., Scotts Road, Southall, Middlesex. This is known as the "CU3A" and provides time markers at intervals of from 0.5 microseconds to 1 millisecond. Marker accuracy is checked against a 2Mc/s internal crystal. The pulse train may be free-running, giving a continuous display, or keyed from a square wave source. An internal variable square-wave generator is incorporated. The calibrator contains its own stabilised power pack and is suitable for mounting in a standard rack.

Rotary Actuator

For applications where solenoid valves are unreliable or of insufficient power, Kinetrol, Ltd., Trading Estate, Farnham, Surrey, has designed an electro-pneumatic rotary actuator for working on a normal plant air line at 80-100 lb. per sq. in. Electrical input may be 230V., a.c., or either 12 or 24V. d.c. Angular travel is 90 deg. and is derived from a single rotary-vane piston so that the unit is of small overall size (3.9 in. by 4 in. by 5.5 in.). Torque is 150 lb. in. The actuator is conveniently fitted to valves, flaps, cocks and similar contrivances.

Motor Control Unit

Three varieties of a basic motor control unit have been designed by the Electrical Remote Control Company, Ltd., Elremco Works, Harlow New Town, Essex, for the automatic reversal of small machines at selected time intervals. In the MCU/A unit the internal timer may be reset by push-button at any part of its cycle. The MCU/B unit does not reset on an interruption of the supply but continues timing from the point reached when the input is restored. A third form of the controller, MCU/S, provides continuous and independent adjustment of the overall timing period as well as of the "on" and "off" periods. Normally the motors would be switched by reversing contactors. Switching capacity of the units is 6 amp at 250V a.c. or 110V d.c. They are applicable to any other switching purpose where periodic and alternate operation of two circuits is required.

Transistor Test Set

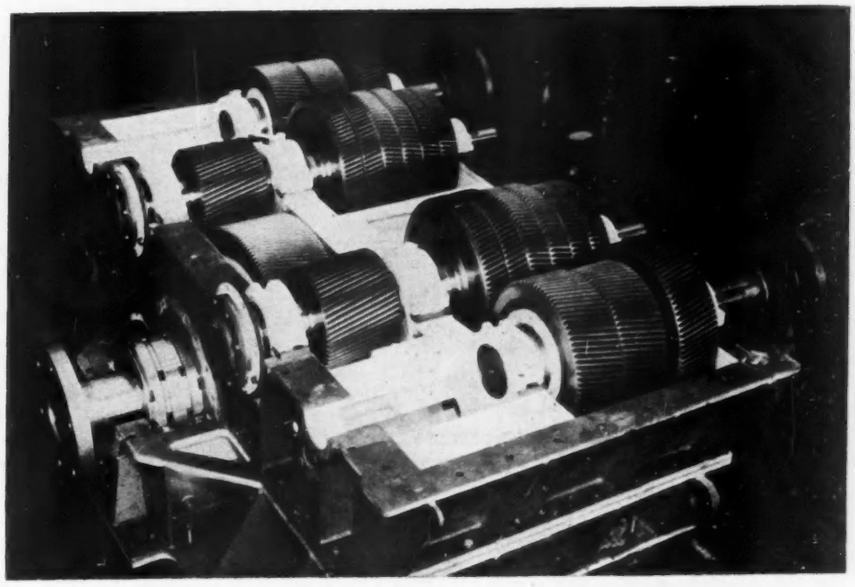
An automatic test and data recording machine for testing transistor devices has been developed by Sylvania-Thorn Colour Television Laboratories, Ltd., Great Cambridge Road, Enfield, Middlesex. The machine can apply up to ten tests per device and the basic rate of testing is 10,000 tests per hour, i.e. 1000 devices per hour with ten tests applied to each. Tests are applied sequentially, with prescribed upper and lower limits for each and conformity with these limits may decide whether some or all of the remaining tests are applied or inhibited. The machine consists basically of a central control unit to which plug-in test units are added. The equipment is fully transistorised and uses standard telegraph machinery for producing output data. It is stated that the system employed could be applied equally well to other equipment such as condensers and resistors.

Fast Wave Display Unit

An auxiliary unit enabling normal d.c. coupled oscilloscopes with a bandwidth not exceeding 50kc/s to display very fast waveforms is now being manufactured by Lion Electronic Developments, Ltd., Hanworth Trading Estate, Feltham, Middlesex. The instrument, known as the "Nanoscope", was developed by the Atomic Energy Research Establishment, Harwell, primarily for use with scintillation counters. The "Nanoscope" operates by sampling the fast waveform with narrow pulses at a number of points. This results in the production of a series of pulses, stretched to render them visible on a normal oscilloscope of restricted bandwidth, which are proportional in amplitude to the corresponding ordinates of the sampled waveform. These ordinate pulses are brightened at their tips, thus tracing the fast waveform as a series of dots on the oscilloscope. Very fast repetitive waveforms of the order of a few nanoseconds (10—9 sec.) duration can be observed.

Binary to Decimal Conversion

To coincide with the introduction of a new ⅝ in. digital display unit, Counting Instruments, Ltd., 5 Elstree Way, Boreham Wood, Herts, has designed a new binary-to-decimal decoder for use both with this instrument and the existing 1 in. display unit. The "Bina-Dec" decoder is suitable for panel mounting single or in assembled groups. Similarly, the display units may be grouped as required, each showing figures 0 to 9 or letters of the alphabet against a coloured background.



Twin input oil operated reverse reduction gear with output of 1260 b.h.p.

Twin-Input Two-Speed Reverse Gear for Tugs and Trawlers

Among the ships which, because of specific operational conditions, have varying power requirements, are tugs and trawlers and both have two standards of power. When towing, a tug requires maximum thrust at slow speed while it is necessary to travel at high speed when running light from one job to another. Again, during trawling operations maximum thrust is called for whereas to reach the fishing grounds or to make port quickly with the catch a trawler needs to command maximum speed. One solution to this problem is the adoption of a two. or three-speed ahead reverse-reduction gear and Modern Wheel Drive Ltd. has found that the Hindmarch/MWD reverse-reduction gear, using Hindmarch oil-operated clutches, can be easily adapted to incorporate two or three ahead speeds. In the standard gearbox, oil-operated ahead and astern clutches are built into the secondary gears to give direct drive to the propeller and the direction of rotation required. To provide two or three speeds ahead the necessary additional gear trains and associated clutches have to be included, at the expense of some increase in the length of the gearbox, and the gear ratios selected to give the optimum propeller speeds to suit the service conditions.

The company has had a two-speed gear in operation for some considerable time, but the latest development is the production of a gearbox for a multi-engine installation. This arrangement is suitable for operation under varying service conditions and by adopting correct gear ratios it should be possible to ensure the attainment of best performance under all working conditions. Such a gearbox has been manufactured by the company for installation in the tug "Sir William Luce" at present under construction by W. J. Yarwood and Co., Ltd., for the Aden Port Trust. This is a twin input two speed ahead oil-operated reverse reduction gear to transmit the power from two Ruston diesel engines each developing 630 b.h.p. at 500 r.p.m. The gears provide for a first speed ahead ratio of 3.49 to 1, a second speed ahead ratio of 2.72 to 1 and an astern ratio of 3.52 to 1 while the weight of box is approximately 16 tons. The arrangement of the gearbox can be clearly seen in our illustration and on each input shaft starting from the input coupling there is a second speed ahead pinion, an astern pinion and a first speed ahead pinion each meshing with its corresponding oil-operated clutch wheel. The astern pinion drives the astern clutch through an idler gear. On each clutch shaft there is in addition a final drive pinion driving the output coupling through the main wheel and a Michell thrust block.

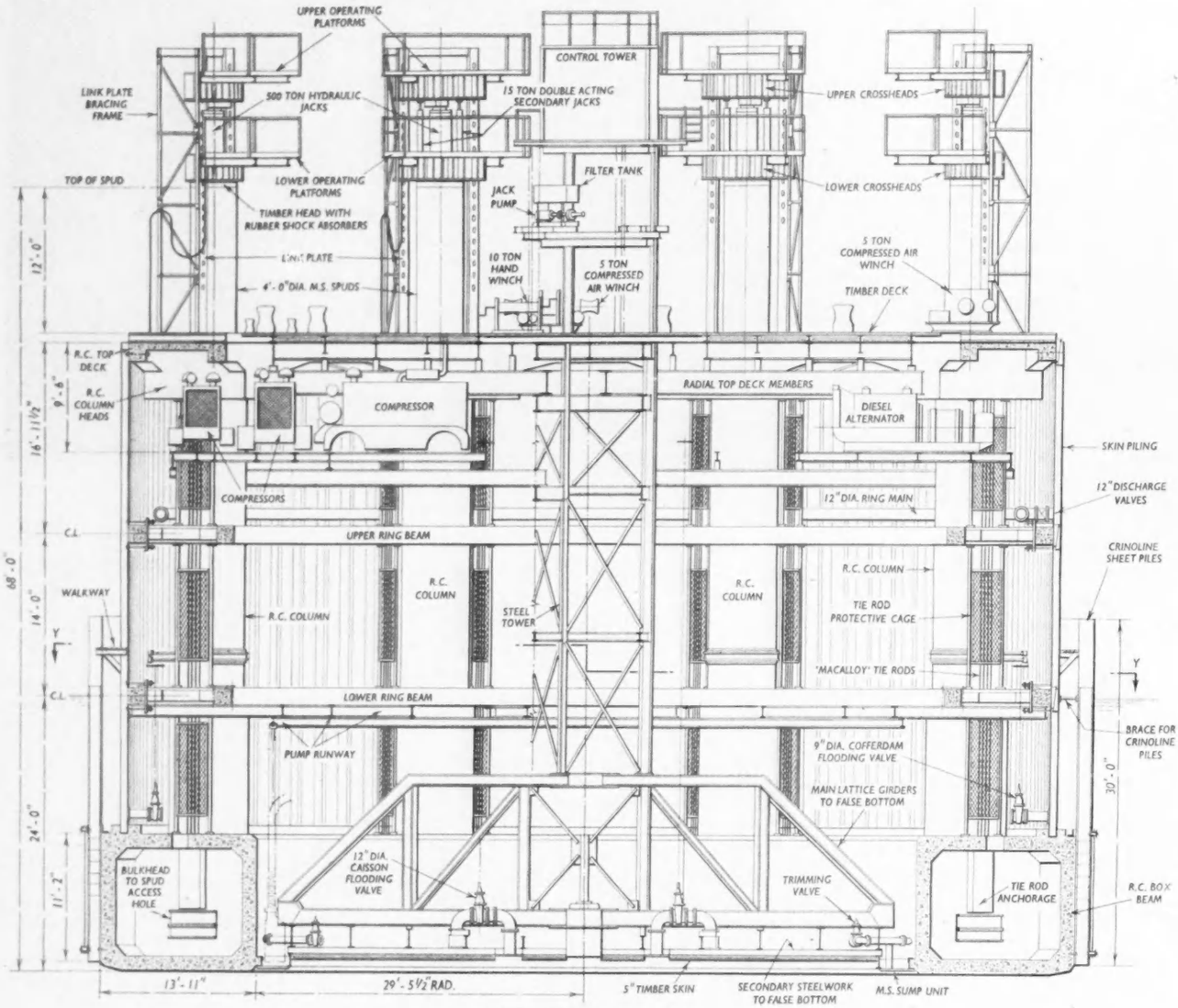
All wheels have a helix angle of 11 degrees 9 minutes and a pressure angle of 20 degrees and the following are the main particulars:

	1st Ahead		2nd Ahead		Reverse		
	Pinion	*Clutch*	*Pinion*	*Clutch*	*Pinion*	*Clutch*	*Idler*
P.C.D. in.	20.9465	25.0395	23.8357	22.1503	19.9835	24.0765	12.2790
Number of Teeth ..	87	104	99	92	83	100	51

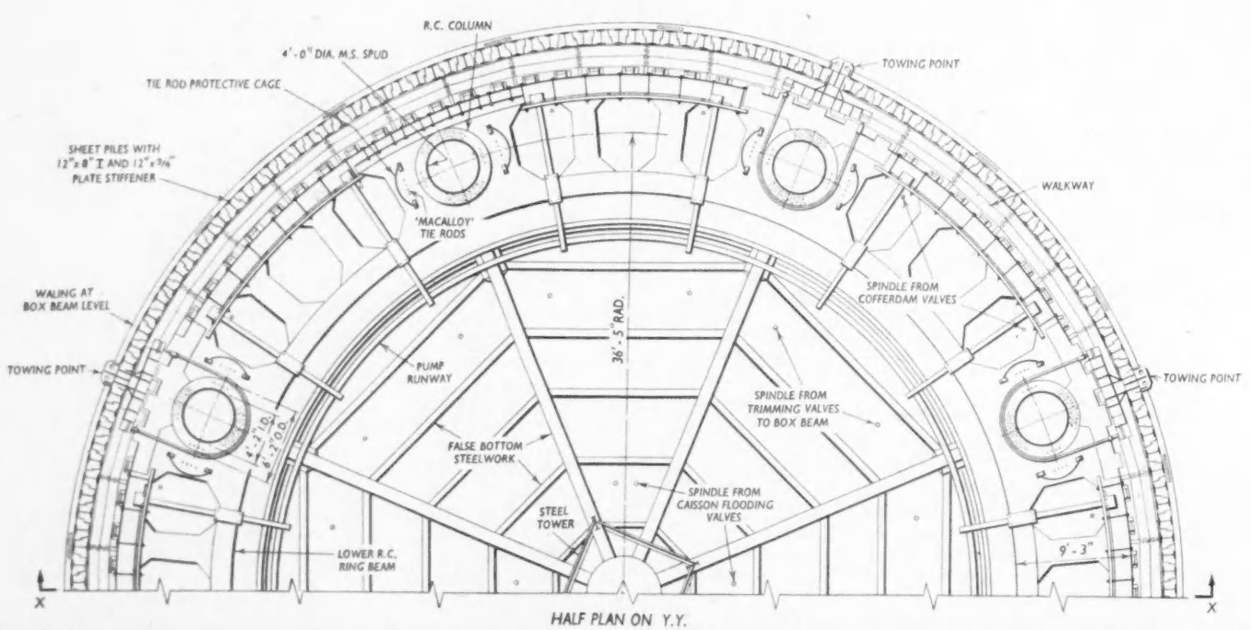
The P.C.D. for the final pinion and the main wheel are 15.1682in and 44.3007in respectively and the corresponding number of teeth are 63 and 184. The main wheel is of built up construction and plain white metal lined bearings are used throughout the gearbox.

Electrically driven main and standby pressure oil pumps are provided and the circuit includes suction strainers, oil pressure regulating valves, filters and a cooler. Control is by two rotary isolating valves and one rotary control cock which has four positions namely astern, stop, first speed ahead and second speed ahead. When placed in the astern or one of the ahead positions pressure oil is fed automatically to the corresponding clutch, the remaining clutches being open to drain. The respective engines are isolated by the associated valves, which are sited on the contro cock assembly.

HINKLEY POINT CAISSON



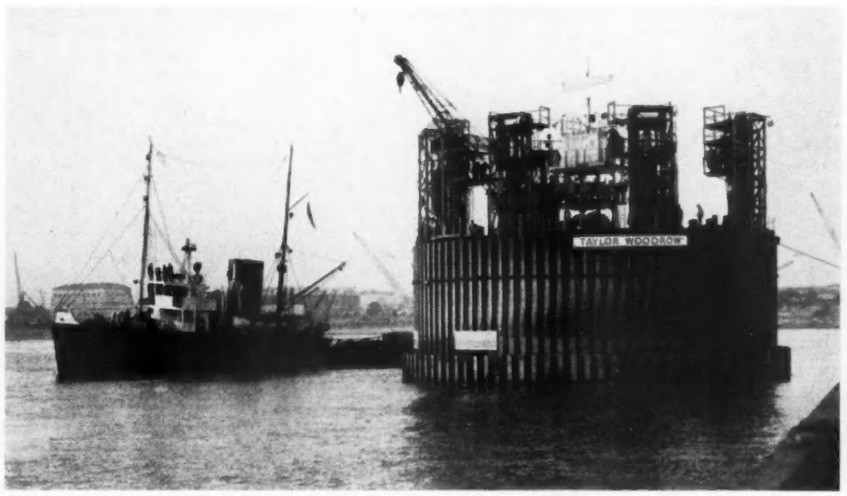
SECTIONAL ELEVATION ON X.X.



HALF PLAN ON Y.Y.

Caisson in floating trim. Its diameter is 20ft, its height 55ft, and its weight about 3800 tons. The spud legs are on a pitch circle of 72ft 10in diameter, and the spuds are each 68ft long. The draft was about 24ft and the estimated position of the centre of gravity 23ft 6in from the base. One foot of draft was equal to abont 150 tons displacement

Hinkley Point Caisson



On the opposite page is a drawing of the caisson which is now in position offshore from Hinkley Point nuclear power station, and within the cover of which the intake for the cooling water system of the power station is being built. The caisson is distinctly original in its design, and we hope that the ensuing description will impart some idea of the ingenuity of its conception and the unusual hazards which have to be faced by an offshore structure of this kind.

The caisson, as drawn, is a combination of permanent and temporary works. The basic idea of the temporary—or constructional—stage was to float out the caisson and then "land" it on spud legs lowered by hydraulic jacks; circumferential steel-sheet-piles could then be lowered and the enclosure thus formed pumped dry to enable the permanent works to be built. The use of retractable spuds—reminiscent of the pierhead structures of the "Mulberry" harbours—was dictated by the nature of the site. The caisson's position is 2000ft offshore, on a sealed slope of 1 : 40, where the tidal range is over 40ft. Currents of 4ft/sec. were reached at mid-tide on the high spring tide of June 20, when the operation was carried out. The rate of fall of the tide was 8/10ft hour at that time. The seabed is of shale or limestone—too hard to encourage pile driving from floating plant—and the prevailing tidal conditions give muddy water, unsuitable for work by divers.

The basic idea behind the permanent works was to give a structure which offered the minimum obstruction to waves, yet had a deck above high tide level, where a simple crane could be installed to operate—as a maintenance procedure and not a day to day control—screens and stoplog gates controlling the intakes.

The Permanent Structure

The drawing shows the caisson as rigged for floating out and sinking. The permanent structure is in reinforced concrete, and consists of a box beam, built as a ring round the "base" of the floating caisson, with eight hollow circular columns rising from it, each to house a "spud". The columns are integrated into a cylindrical frame by three ring beams, the top ring to carry the deck of the permanent structure. The spuds are steel cylinders each 4ft in diameter, which are eventually cut off at box beam level, filled with concrete and underpinned. All the rest of the structure shown in the drawing is temporary.

Tunnels to carry cooling water to the power station are being driven from the shore, and will connect with shafts sunk from the caisson. Two tunnels each 12ft in diameter serve the 500MW station now under construction, but the intake will in addition have an access shaft, plus provision for two shafts to serve intake tunnels for a future "B" station of 800MW. The total capacity of the intake will be 85 million gallons per hour—35 for the "A" station and 50 for the "B" station.

The underside of the box beam is at a level of –23 O.D.; the seabed varies from about –28 to –31 O.D., and extreme low water level is about –21.5 O.D. Thus cooling water will be drawn in below the box beam, between concrete piers built round each of the "spuds", and a concrete slab will be built right across the caisson at box beam level. A control concrete tower and a top deck will be the only additions to the basic structure above box beam level. Guard screens will be fixed round the periphery of the structure, and gate slots built through the slab. A crane turning round the central tower will handle screens and gates. Detailing of this arrangement has still to be finalised; with the tight constructional schedule, design and construction have been going on at the same time.

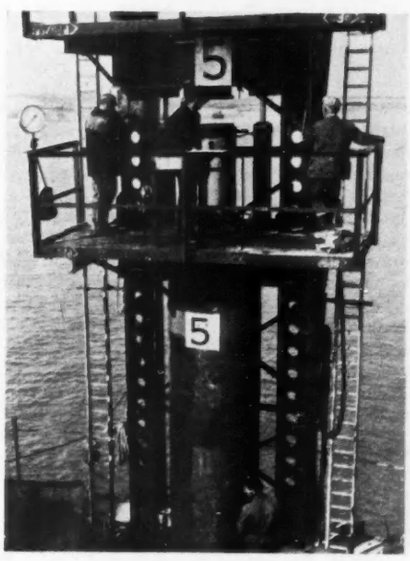
Floating Out The Caisson

In "floating trim" the caisson had its sides enclosed by steel sheet piles, and a timber false bottom stiffened by a steel truss, the latter carrying a central steel tower rising to the steel and timber decking, there being a top deck and below it a plant deck, at this stage. Around the outer side of the box beam, "crinoline" piles were positioned, which will now be driven into the seabed.

Jacking towers and crossheads were erected above each spud leg, the jacking loads being transmitted to the box beam by sets of prestressed steel bars. The design load taken by each "spud" was 500 tons, and thus there was a 500-ton jack installed at each rig, but there were also two subsidiary jacks which were operated together either to control the lowering of the spud under its own weight or to raise or lower the upper crosshead. The stroke of each main jack as 2ft, but by alternately pinning the upper and lower crossheads a travel of 13ft was obtained for each spud.

At the top of each guide cylinder, and at the underside of the box beam, each spud was guided by a steel collar. There was a rubber shock absorber between each spud and its crosshead which deflected 2¼in under a 50-ton load, and in addition, eight short lengths of steel tube were fitted inside the lower collar, and holding the spud centrally. If the side load at this point exceeded 30 tons, however, the tubes would progressively collapse, with complete collapse at 90 tons. This expedient ensured even distribution of side loads on all the spuds, and prevented any one of them sticking in the collars, if the caisson tilted.

It was estimated that a fully loaded spud would penetrate 3ft into the seabed. The caisson was positioned at slack water and "grounded" about 2½ hours later. To ensure even loading on the eight spuds and to achieve a horizontality at the correct level, the eight spuds were operated in three groups, of three, three and two respectively. Thus initial grounding was on three spuds, to give three-point support; the box beam was designed to span an angle of 135 deg. under these conditions. Additional rubber shock absorbers were placed on these three spuds to absorb the impact of initial grounding, after which flooding commenced. After grounding, the second group of three spuds was lowered to take the load—by this time reaching 1200 tons due to progressive flooding of the caisson. Thus in the first hour, the load-bearing capacity of six spuds had been positively



Jacking equipment for spud leg

tested. Finally, all eight spuds were operated in sequence so that the caisson load was evenly distributed amongst them. Internal and external water levels were then kept balanced, until after completion of the curtain of "crinoline" piles.

Aspects of the floating and sinking operation which required detailed attention were proving and trim tests at the temporary dry dock where the caisson was built (trimming could be effected by flooding compartments in the box beam) and the actual towing out and positioning operation. Only one point is mentioned here by way of example. Wave tests were carried out with a model in a tank, and it was found that waves of short wave length and up to 3ft in amplitude had little effect. However, waves of about 300ft wave

length and about 10/12 seconds period induced resonance and severe motion. A wave recorder with a filter giving amplitude and period data was therefore installed at the site, and an analysis of weather maps undertaken to predict Atlantic storms which might generate synchronous waves at the site.

Plant installed on the caisson when it was floated out included pumps and valves for flooding and trimming, a 30 R.B. crane and a 22 R.B. crane for pile driving, four 5-ton compressed-air-operated winches, with associated bollards built into the caisson and equipped with pulley blocks and fairleads, two 10-ton hand-operated winches, all the hydraulic motors, pumps, etc., for the jacks, three compressors and two diesel-alternator sets. Ancillary equipment included radio telephones, depth gauges, and searchlights amongst other things.

For completion of the permanent structure, a steel tower is to be erected to serve as the terminal tower of a ropeway from the shore. All constructional materials will then be carried by the ropeway.

The Hinkley Point nuclear power station is being built for the Central Electricity Generating Board by The English Electric, Babcock and Wilcox, and Taylor Woodrow Atomic Power Construction Company Ltd. The work described here was carried out by Taylor Woodrow Construction Ltd., who retained C. S. Allot and Son as the consultants. The jacks and associated hydraulic equipment were supplied by Tangyes Ltd., the tank tests were done by Saunders Roe Ltd., and the storm analyses by the Institute of Oceanography. The towing contractor was Metal Industries (Salvage) Ltd.

Southern Railway Kent Coast Electrification

No. I

Electric train services between London, Ramsgate and Dover (via Canterbury) were introduced with the summer timetable on Monday, June 15. This is the first phase in the programme of the Southern Region, British Railways, for extending electrification from its previous limits at Gillingham and Sevenoaks to the Kent coast and covers 68 route-miles of main line, together with the 8-mile branch from Sittingbourne to Sheerness. Electrification has been accompanied by improvements to track layout and widening, resignalling, the provision of new rolling stock and locomotives, and the complete recasting of the timetable to provide regular-interval services.

HIGH priority was given in the British Railways modernisation plan to electrifying the lines of the Southern Region serving the Kent coast. Electrification already extended to Gillingham on the northern route via Faversham, and to Sevenoaks on the line running through the middle of the county via Tonbridge and Ashford, and since this was on the d.c. third-rail system it was decided that the same method should be used for the extensions. Much work had been done in the London area on replacing rotary-converter substations with rectifier equipment (THE ENGINEER, February 26, 1954), and all these installations were planned for 750V d.c. instead of 660V as had been used previously, although provision was made for operating at the lower voltage while some of the earlier rolling stock remained in service. The Kent coast scheme, however, is working from the outset at 750V, its services being operated by new trains and locomotives with traction equipments designed for that voltage.

In order to derive maximum advantage from the first phase of the electrification, which extends from Gillingham to Ramsgate, and Faversham to Dover (see Fig. 1), improvements to track and signalling were necessary in the area already electrified between Gillingham and London. Colour-light signalling, for example, begins at Brixton, and extensive track alterations were carried out over a long stretch of line beginning at Shortlands Junction, where the direct line from Victoria and the loop which leaves it at Brixton, to travel via Catford, converge. Realignment of curves at the junction has enabled the speed limit of trains on the direct line from Victoria to be raised from 40 m.p.h. to 60 m.p.h., and of those taking the Catford direction from 20 m.p.h. to 40 m.p.h. This loop is followed on occasions by Kent coast trains and also carries a service to and from Holborn Viaduct. Between Shortlands and Swanley the tracks have been rearranged as two up and down pairs instead of the previous layout in which the up lines formed one pair and the down line another, with the result that conflicting movements at junctions have been reduced. On this section occur the junctions at Bickley between the main lines from Victoria and from Charing Cross. The realignments here, and the raising of speed limits from 30 m.p.h. to 50 m.p.h. were shown in our January 2, 1959, issue, pages 9 and 10.

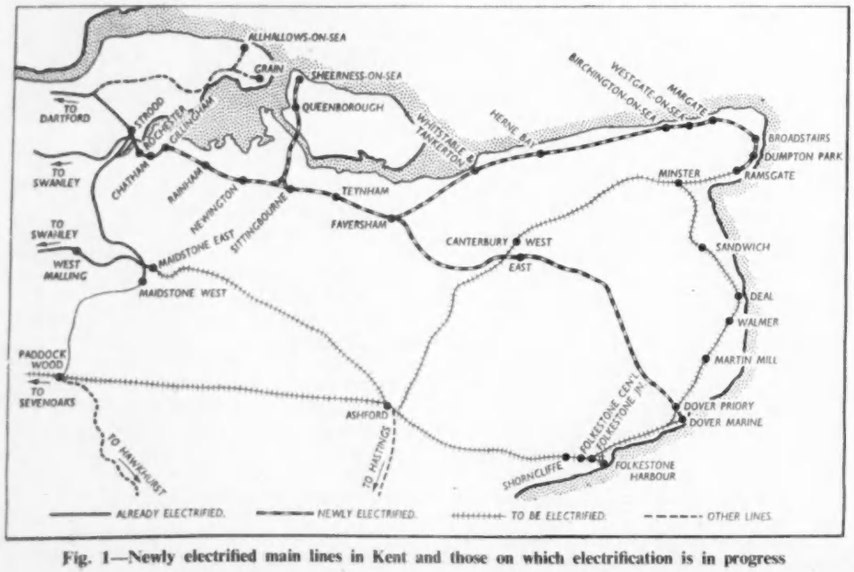


Fig. 1—Newly electrified main lines in Kent and those on which electrification is in progress

Four tracks have been continued from Bickley to Swanley, and on this 5-mile stretch eleven bridges and a viaduct had to be rebuilt, and a completely new station has been provided at St. Mary Cray. In the 7-mile length from Shortlands to Swanley 850,000 tons of earth were moved. The contractor for the civil engineering work in this area was George Wimpey and Co., Ltd.

On the newly electrified section, beginning at Gillingham, the major construction work and track alterations have been between Rainham and Newington, and on the Sheerness branch. Two new tracks have been laid in the form of up and down passenger loops extending over 2½ miles from a point near Rainham to Newington station. These lengthy passing loops enable a slow train to be passed by a fast train while travelling, instead of being held at the station platform for this purpose. On the Sheerness branch doubling has been carried out from the triangular junction at Sittingbourne as far as the Swale bridge (3 miles). The line across the present bridge has been electrified, although trains will eventually use a new bridge which is being built alongside the present structure. In the new service the branch has an hourly through train from Victoria via the western spur at the junction in addition to the usual connections via Sittingbourne and the eastern spur. The contractor for track widening and bridge works in this area was Taylor Woodrow.

At many stations throughout the route to Ramsgate and on the branch from Faversham to Dover platforms have been lengthened to take twelve-car trains, or eight-car trains on the slow lines. Other important constructional work associated with the scheme has been carried out at Stewarts Lane depot, London, by Holloway Brothers (London), Ltd. This firm was also responsible for extending and modernising workshops and sidings at Ramsgate.

There were four main contracts at Stewarts Lane depot. Under one a large steel-framed and insulated asbestos running shed (Fig. 2) has been provided for maintaining main line electric locomotives. This includes staff accommodation, stores, heating, lighting, gas, and hot and cold water services. The shed has two 25-ton overhead travelling cranes, an Atlas wheel lathe installed below ground level and two full-length inspection pits. Electric light bulkhead fittings and low voltage socket outlets for operating electric tools are built into the sides of the pits. New roads, track-laying and a retaining wall were included in this contract.

The existing carriage cleaning shed has been extended and now has fourteen sidings, with eight new inspection pits for maintaining 12-car electric trains. There is provision on all sidings for washing down and cleaning out carriages. A new boiler house has two

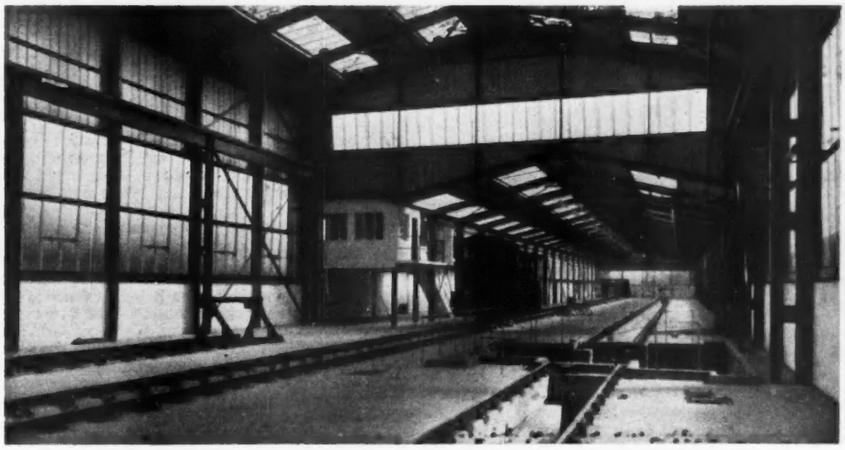


Fig. 2—Interior of electric locomotive running shed at Stewarts Lane, showing overhead crane rails in higher part of building and pit for wheel truing lathe

oil-fired boilers each developing 12,500,000 B.Th.U. per hour to feed a network of high pressure hot water mains at 250 lb per square inch, 360 deg. Fah. Five calorifier rooms receive heating from these boilers to supply low pressure heating for offices, workshops, and carriages being serviced in the cleaning shed.

Conversion of part of the steam locomotive shed provides for housing, inspecting and carrying out repairs on new diesel locomotives. Adjacent to this is a fuelling and servicing siding to supply locomotives with diesel oil and water. A drivers' training school has also been provided. This is a modern building designed by the architect of the Southern Region, having three lecture rooms, a mess room and other facilities where drivers are instructed on the working and driving of diesel and electric locomotives.

At Ramsgate, Holloways have erected a multiple-unit stock lifting shed, which is in all constructional respects similar to the locomotive running shed at Stewarts Lane. There is, however, only one 25-ton travelling crane and no wheel truing lathe.

There have been extensions to the carriage cleaning shed, involving breaking up and relaying about 1600 square yards of floor ; lifting and relaying about 300 lineal yards of track inside the shed ; and laying down reinforced concrete aprons at each end of the shed, including about 220 lineal yards of track. A lean-to of brickwork alongside the shed houses new offices and staff accommodation of about 2000 square feet floor area, and approximately a further 1500 square feet of existing offices and accommodation are now fully modernised.

A carriage cleaning stage was formed with precast concrete units about 2ft 4in wide and of a total length of 820ft. Straddling the platform and the tracks on each side are steel gantries carrying lighting and water services at approximately 66ft intervals, equal to the length of a carriage.

Signalling

Colour-light signalling has been installed over the whole route to Ramsgate, beginning at Shepherds Lane box, Brixton. This work has been divided among three contractors. The Westinghouse Brake and Signal Company, Ltd., was responsible for the Shepherds Lane resignalling and for the section from Herne Hill to Swanley Junction via Penge East and via the Catford loop. Relay interlocking panels have been installed at Beckenham Junction, Shortlands Junction and Chislehurst Junction, the first two having push-button control and the third, Chislehurst, using the Westinghouse O.C.S. (one-control switch) system. Six other signalboxes in the area have been rewired to new relay rooms. Miniature relays have been used for interlocking, as distinct from signal and point control functions.

Farningham Road to Sittingbourne, with the Sheerness branch, was undertaken by the Siemens and General Electric Railway Signal Company, Ltd. On this section relay interlocking panels have been provided at Rainham, Rochester and Sittingbourne. At Rainham route-setting is by three-position keys (off, A-route, B-route) as this arrangement covers the requirements, but the Rochester and Sittingbourne panels have entrance keys and exit push buttons, except for a few cases where a three-position key covers the facilities required. Hydraulic equipment operating at 250 lb per square inch oil pressure has been provided for operating level crossing gates at Rainham.

The Sheerness branch is controlled from Sittingbourne by a centralised traffic control system using electronic apparatus for transmitting controls and scanning the condition of the remote apparatus. The system, developed for general remote control purposes at the Coventry Telephone Works of the G.E.C., is known as EDICT (Electronic Digital Indicating and Control Transmission) and uses cold cathode triodes in ring counter circuits for opening the control and indication channels in a 3·84-second cycle covering 160 positions, and transistor circuits for transmission of controls and indications over the voice-frequency telegraph channels.

Resignalling from Teynham to Ramsgate has been carried out by Metropolitan-Vickers-GRS, Ltd., which has provided an NX (entry-and-exit) control panel for Faversham, the junction with the Dover line, and, in common with the other signalling contractors, has converted numerous signalboxes, where mechanical frames are retained, for the operation of colour-light signals and power-operated points by the provision of circuit controllers, lever locks and relay equipment.

With the new signalling the headway for stopping trains in the London area is two and a half minutes. From Margate to Ramsgate it is three minutes for stopping trains, and in the remaining area, with one or two exceptions, it is three minutes for non-stop trains. Eight new signalboxes have been built, seven with panels as noted above, and twenty-eight relay rooms have been provided at other boxes. The number of signalboxes displaced is thirty-one.

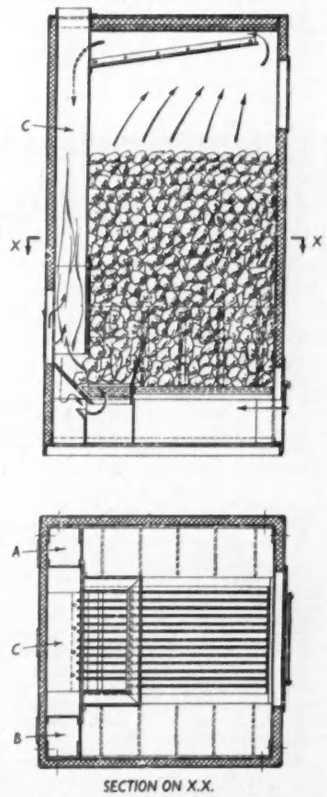
(To be continued)

Smokeless Combustion System

Less smoke even when burning highly bituminous coal, as compared with conventional appliances burning coke or other smokeless fuels, is the claim made for a system of combustion invented by Mr. Sven Wernheim whose patents rights are being handled by Licentia, Ekman & Brundin, Stockholm. The 'Escomb' system is stated by its inventor (who was jointly responsible for the design of the 'Aga' cooker) to achieve over 99 per cent combustion efficiency and the elimination of smoke and carbon monoxide by a double combustion process. In the first stage, bituminous particles are expelled from the fuel. In the second stage, they are passed through the glowing fuel bed and thereby converted to carbon monoxide, hydrogen, etc., which are burned in turn by the admission of secondary air.

It has been found that complete and smokeless burning of peat, can be achieved even with a moisture content of 50 per cent. The importance of this to countries like Sweden and Ireland, where peat is abundant, is considerable. Laboratory tests at the Statens Provningsanstalt (Government Testing Station), Stockholm, are stated to have shown that wastage of combustible gases is less than 0.01 per cent, representing about 0.1 per cent of the calorific value of the fuel.

The accompanying illustration shows a section through a solid fuel appliance incorporating the new principle. The smoke and flue gases which are liberated from the fuel are returned through channels A and B and pass through the bottom of the fuel bed where conversion into carbon monoxide and hydrogen takes place. These gases then escape through gas combustion channel C where they are burnt by means of secondary air. Appliances incorporating the system are being manufactured under licence by Hammond Lane Ironfounders Ltd., Dublin.



Principle of the "Escomb" system of smokeless combustion in which combustion gases are recirculated through the incandescent part of the fuel bed. The system takes up about 10 per cent of the internal volume of a normal stove.

Personal and Business

Appointments

MR. A. E. BARDEN has been appointed general sales manager of Edibrac, Ltd.

MR. P. B. FORREST has been appointed works manager of Fawcett Preston and Co., Ltd.

DR. C. B. SPEEDY has been appointed to the board of directors of Lion Electronic Developments, Ltd.

MR. R. H. FOSTER, M.I.C.E., has been appointed a managing director of M. and W. Grazebrook Ltd.

MR. DOUGLAS B. ANNAN has been appointed sales manager of the guided missiles division of de Havilland Aircraft of Canada Ltd.

SIR CHARLES CONNELL has been appointed chairman of the research board of The British Shipbuilding Research Association in succession to Sir Wilfrid Ayre.

MR. W. J. RATTERY has been appointed manager of the Glasgow depot of The Marconi International Marine Communication Co., Ltd., in succession to Mr. J. P. Dawson who has retired.

MR. J. L. BLACKWOOD MURRAY, managing director of Leyland Motors' South African company, has accepted an invitation to join the board of directors of Leyland Motors Ltd., England.

MR. F. W. NEWELL has been appointed marine manager of Companhia Marconi Brasileira, the Brazilian associate of The Marconi International Marine Communication Co., Ltd.

BRITISH INSULATED CALLENDER'S CONSTRUCTION CO., LTD., has announced the appointments of Mr. J. N. Gibson, Mr. J. R. McDonald and Mr. D. M. H. Rooney as executive directors.

TEXAS INSTRUMENTS LTD., announces that Dr. James T. Kendall has been appointed general manager marketing, and Dr. John Powell has been promoted general manager technical in place of Dr. Kendall.

MR. R. J. SMITH, A.M.I.E.E., has been appointed to take charge of the organisation which The General Electric Co., Ltd., is setting up in Japan to supervise the building of a 150MW nuclear power station at Tokai-Mura, 70 miles north-east of Tokyo.

THE BRITISH ELECTRICAL AND ALLIED MANUFACTURERS' ASSOCIATION announces that Mr. Stanley F. Steward will take up his executive responsibilities as the director on August 1. Colonel B. H. Leeson, M.I.E.E., will relinquish his position as the director as from July 31. Mr. D. Maxwell Buist, M.I.E.E., export director, is to retire on April 30, 1960, when he reaches normal retiring age.

Business Announcements

UNIVERSITY MICROFILMS LTD., has moved to 44, Great Queen Street, London, W.C.2 (telephone Holborn 0808).

BRITISH INSULATED CALLENDER'S CABLES, Ltd., states that the telephone number of its "Panelec" heating division, has been changed from Langham 4234 to Museum 1600.

THE MARCONI INTERNATIONAL MARINE COMMUNICATION CO., LTD., has announced that Mr. J. T. Marler, manager of the operating division, and Mr. J. P. Dawson, manager of the Glasgow depot, retired on June 30.

WEST GLOUCESTERSHIRE WATER COMPANY announces that it amalgamated with the Bristol Waterworks Company on July 1. Future purchasing will be done centrally from the offices of the Bristol Waterworks Company, Telephone Avenue, Bristol, 1.

CHAPMAN AND HALL LTD., announces that it has been appointed sole agent for the United Kingdom and Europe for John Rider (Publisher) Inc., of New York. It has also been appointed sole agent for the United Kingdom, Europe and the British Commonwealth for Consultants Bureau Inc., and Plenum Press Inc., also of New York.

DOMESTIC ELECTRIC APPLIANCES AND BEAMA.—The British Electrical and Allied Manufacturers Association (BEAMA), 36 Kingsway, London, W.C.2, has set up a separate division to meet the needs of its members in the field of domestic electric appliances. The new division works under a Domestic Appliance Board (chairman, Mr. W. J. Bird, a director of The General Electric Company Ltd.).

B.T.R. INDUSTRIES, Ltd., has acquired from Kleber-Colombes, of Paris, the manufacturing rights in Great Britain, of the product known in France as "Klegecell," and in this country as "Plasticell." Microcell, Ltd., 9, Kingsway, London, W.C.2, a member of the B.T.R. Group, will market "Plasticell" throughout the United Kingdom, and the promotion and sales of the product to users in the glass reinforced plastics industry will be handled through Glass Yarns and Deeside Fabrics, Ltd., a Microcell associated company.

Contracts

HUNTINGTON, HEBERLEIN AND CO. LTD., subsidiary of Simon-Carves Ltd., is to build a sinter plant for Richard Thomas and Baldwins Ltd. at the Redbourn steelworks, near Scunthorpe.

THE GENERAL ELECTRIC CO., LTD. has received the order to supply the diesel-electric machinery for the two Torpoint chain ferries being built by John I. Thornycroft and Co., Ltd., for the County Council of Cornwall.

CHARLES HILL AND SONS LTD. has received an order from the British Transport Commission for two dredgers: the larger is propelled by twin screws, has three grab cranes and measures 214 ft. by 44 ft. by 17 ft.; the smaller measures 156 ft. by 34 ft. by 14 ft. 9 in., is propelled by a single screw and is fitted with two Priestman grab cranes. Both ships will be powered with Ruston and Hornsby geared diesel engines.

DECCA RADAR, LTD., has received an order from the Swedish Civil Aviation Board for a Decca "D.A.S.R.1" S-band air surveillance radar for installation at Malmo Airport. This equipment is one of a new range for S-band working in which the height and distance coverage characteristic of these frequencies has been combined with greater immunity from effects of rain and other precipitation, and from permanent echoes. A special version of the "D.A.S.R.1" series, known as the "MR100", is already in operation at the Wisley airfield of Vickers-Armstrongs (Aircraft), Ltd., and was described in our May 29 issue.

Miscellanea

DUCTILE IRON PIPES.—A plant for the production of iron pipes is to be installed by The Stantion Ironworks Company, Ltd., Nottingham. It is expected to be operating in about eighteen months' time.

MR. L. K. EVERITT.—We have learned with regret of the death, which occurred suddenly in Paris, of Mr. L. K. Everitt, director and general manager of the steel department of Edgar Allen and Co., Ltd. He was fifty-seven.

SHEERNESS DOCKYARD.—The Admiralty has agreed, subject to the completion of a contract, to sell Sheerness Dockyard to Building Developments Ltd. The intention is to develop the dockyard as a single or a few large units for engineering production.

THE HAWKER SIDDELEY GROUP has agreed with the Indian Defence Ministry to manufacture in India the Avro 748 twin turboprop airliner. The aircraft are intended for the replacement of the Indian Air Force 'Dakota' fleet.

COLD BOX.—Research and Control Instruments Ltd. announce the introduction of Philips Cold Box installation which has a net content of about 400 litres for temperatures down to minus 160 deg. C. Refrigerating capacity at minus 100 deg. C. is 4400 B.T.U./hour and 2560 B.T.U./hour at minus 160 deg. C.

TUG MACHINERY.—We are informed that each of the three single screw tugs being built for the Liverpool Screw Towing and Lighterage Company will be propelled by a Ruston 6 ATCM diesel engine driving through a Hindmarch/M.W.D. mark M2 WR5 oil-operated reverse reduction gear, reduction ratio 3 to 1.

COLONIAL DEVELOPMENT.—Approval was given during May to seventy grants and loans, totalling £2,739,650, under the Colonial Development and Welfare Acts. They include provision for water supply and road improvement in Malta, British Guiana and Tanganyika.

AGRICULTURAL AVIATION GROUP.—The Royal Aeronautical Society has announced the formation of an Agricultural Aviation Group. The aims of the group are to further the use of aircraft in agriculture, forestry, pest control, seeding and fertilising and to provide facilities for those interested in such matters to meet for the exchange of ideas and information.

RESEARCH PROJECT FOR DECONTAMINATION OF NUCLEAR EFFLUENTS.—The Italian Comitato Nazionale per le Richerche Nucleari has acquired from William Boby and Company Ltd., Rickmansworth, as a research project, one complete electrodialysis stack of the type pioneered by the British firm, for experiments in decontamination of nuclear effluents.

CREEP INFORMATION CENTRE.—To render data on the strength of materials at high temperatures more readily available, a Creep Information Centre is being set up at the National Engineering Laboratory, East Kilbride, Glasgow It is hoped that all users, manufacturers, and research organisations concerned with high temperature materials will co-operate in contributing data; it is intended to record data for materials of British origin in a standard form.

R.M.S. "VICTORIA".—Yarrow and Co., Ltd. has completed the assembly of the R.M.S. "Victoria" for the passenger and cargo service on Lake Victoria of the East African Railways and Harbours. The ship measures: 260ft length overall, 40ft breadth moulded, 21ft depth moulded and has a load displacement of 1500 tons, an operating range of 1500 miles and a service speed of 13¼ knots. Propulsion is by two Crossley two-stroke diesel engines of 1900 total b.h.p. The ship will be dismantled and delivered to Kisumu for re-assembly ready for service on the lake.

SECOND TRANS-ATLANTIC TELEPHONE CABLE.—Laying of the deep sea section of the first telephone cable system to link North America with the mainland of Europe was completed recently. The final splice of the trans-Atlantic section of the twin cable system between Penmarch in France and Clarenville, Newfoundland, was laid by the British cable-ship "Monarch" ten miles of the French coast. Only the 326-mile single cable link between Newfoundland and Nova Scotia remains to be laid. The system is expected to be in operation this autumn.

FIRST ELECTRICITY SUPPLY SCHOLARSHIPS—Forty-five university scholarships have been awarded by the electricity supply industry to boys at public and grammar schools. Nineteen of the scholarships are offered by the Central Electricity Generating Board which needs scientists and engineers, and twenty six by the twelve area boards which need electrical engineers. The scholarships are worth £450 a year at Oxford or Cambridge or £400 at other universities. The only "strings" are that scholars should spend a short training period in the industry beforehand and return to the industry for at least two years after graduating. Particulars can be obtained from The Electricity Council, Trafalgar Buildings, 1 Charing Cross, London, S.W.1.

INTERNATIONAL ENGINEERS' CONGRESS. — From September 9 to 12, the Fédération Européenne d'Associations Nationales d'Ingénieurs (FEANI) will hold its 3rd International Congress in Brussels. The general theme will be "The Engineer and the Shaping of a United Europe". As an organisation of thirteen Western European national institutions of engineers, FEANI exists for co-operation on the natural sciences and technology. The four working sessions will deal with energy and economic policy, the role of the engineer, and problems concerning scientific and technical personnel. The general secretariat of the Congress is F.A.B.I., Hotel Ravenstein, 3, Ravenstein, Brussels 1. Intending participants should enrol by August 8.

RETIREMENT OF PROFESSOR A. ENGELUND.—Prof. Anker Engelund is retiring as Rector of the Technical University of Denmark with which he has been associated since 1914, first as assistant lecturer, later senior lecturer, and since 1928 as professor, becoming vice-rector in 1937 and rector in 1941. One of Denmark's leading civil engineers, Prof. Engelund was responsible for many major bridges built in Denmark between the two wars, in particular those across the Lille Bælt and the Storstrommen Strait. For the construction of the Lille Bælt Bridge, Engelund devised a novel form of concrete caisson which was launched from a slipway, towed to the site upside-down and turned over through 180 degrees before being sunk in position.

SHIP TRIALS SYMPOSIUM.—The North East Coast Institution of Engineers and Shipbuilders announces that a Symposium on Ship Trials and Service Performance Analysis will be held on April 11, 12 and 13, 1960, in Newcastle upon Tyne, and the following papers will be presented: "The Prediction of Ship Performance from Model Tests," by Sir Victor G. Shepheard; "Methods for Carrying Out Ship Model Resistance and Propulsion Experiments," by Dr. F. H. Todd, B.Sc., Ph.D.; "Propeller in Action Behind a Ship," by Professor L. C. Burrill, M.Sc., Ph.D.; "A Method of Predicting Measured Mile Performance from Tank and Trial Results," by D. I. Moor; "Service Performance Analysis of a Fleet of Tankers," by A. Logan; "Turning and Manœuvring Trials," by R. N. Newton; "Service Performance of Cargo and Passenger Vessels," by J. Dieudonné and M. Jourdain; and "Reconciliation of Model Data, Measured Mile Results and Service Performance of Ships," by Professor E. V. Telfer, D.Sc., Ph.D.

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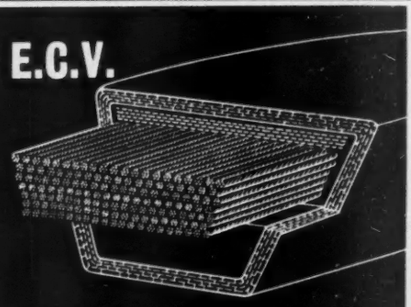

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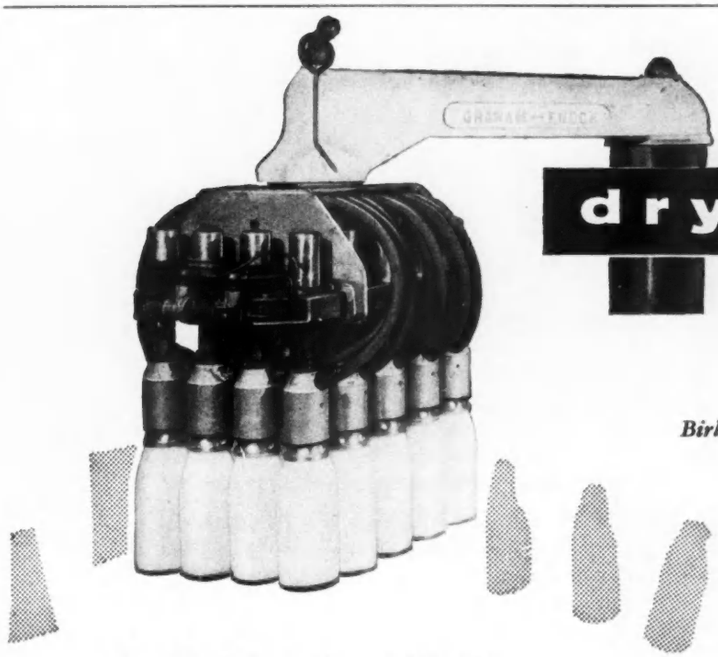

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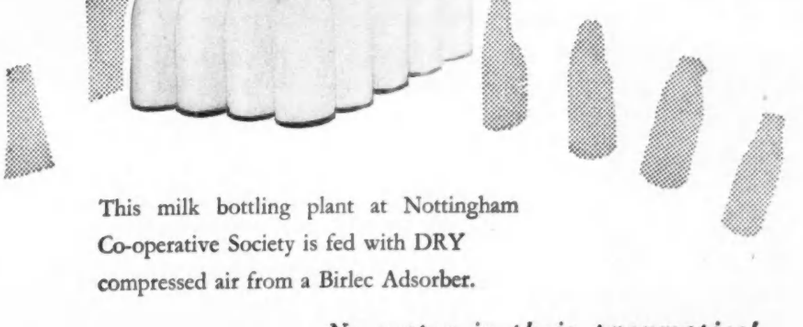

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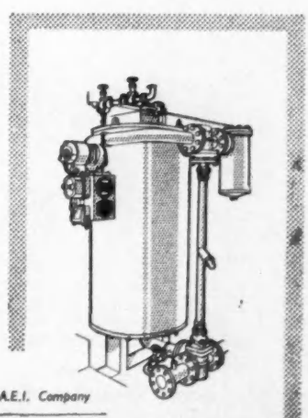

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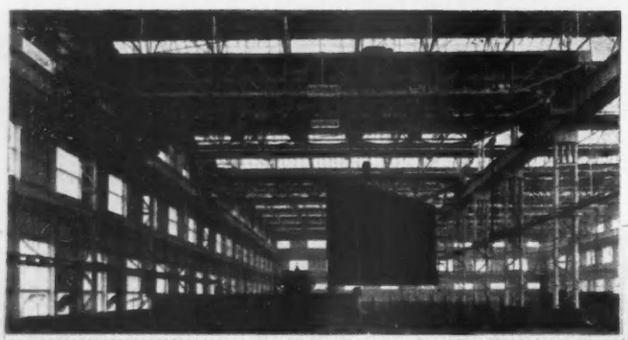

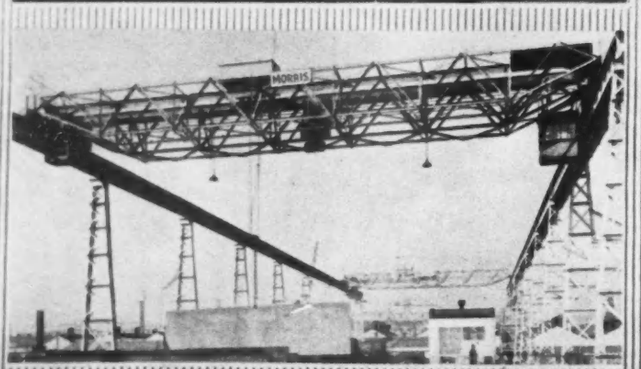

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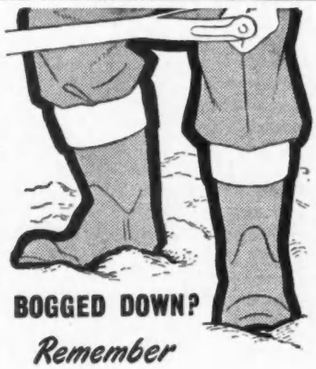

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